O Papel da Universidade no Século XXI: o MIT e o Crescimento do Brasil

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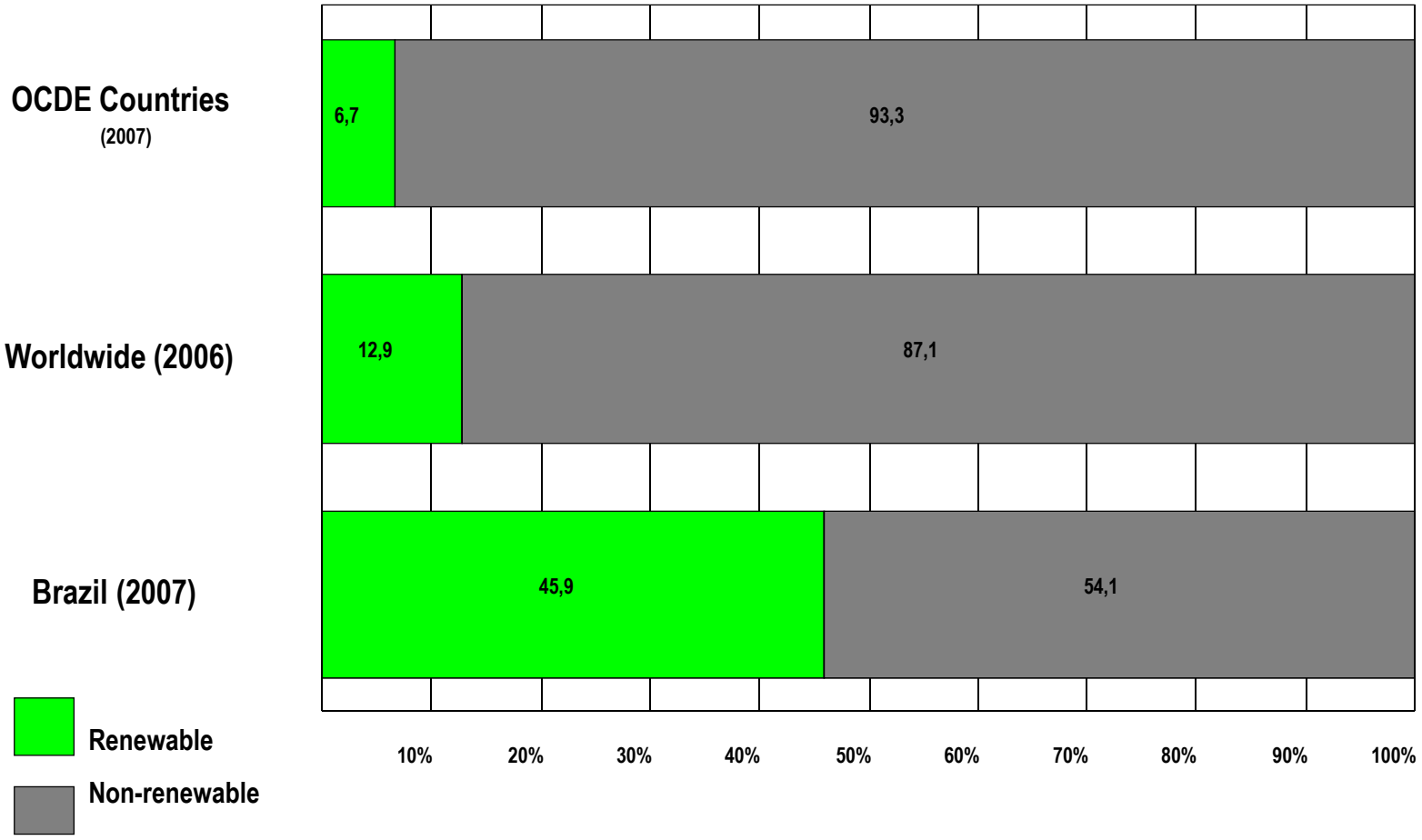
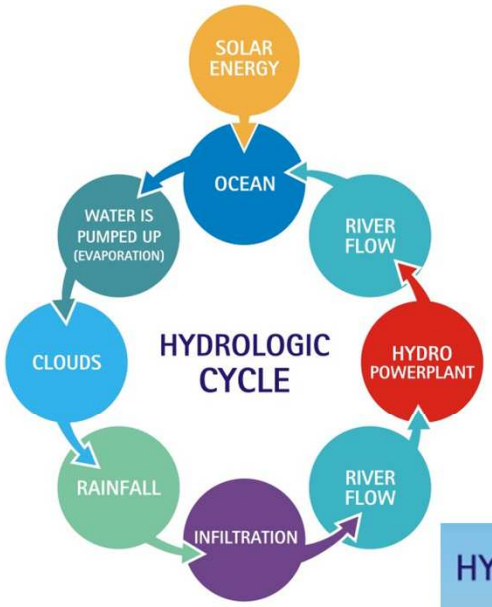
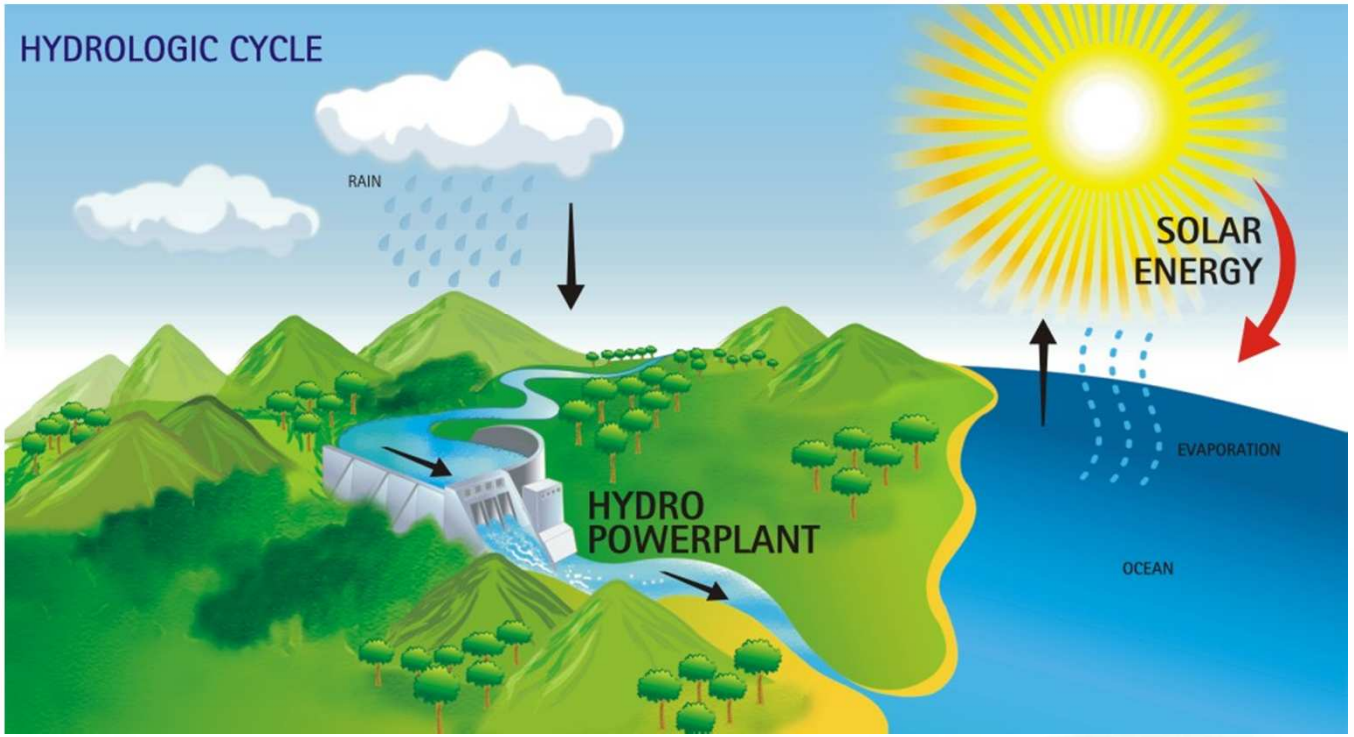
São Paulo - Brasil

Brazilian energy source is renewable





We have been producing electricity from solar energy for more than a century.



Brazil power sector at glance (2008)

Installed capacity:

104 GW

74% is hydro

Peak demand:

64 GW

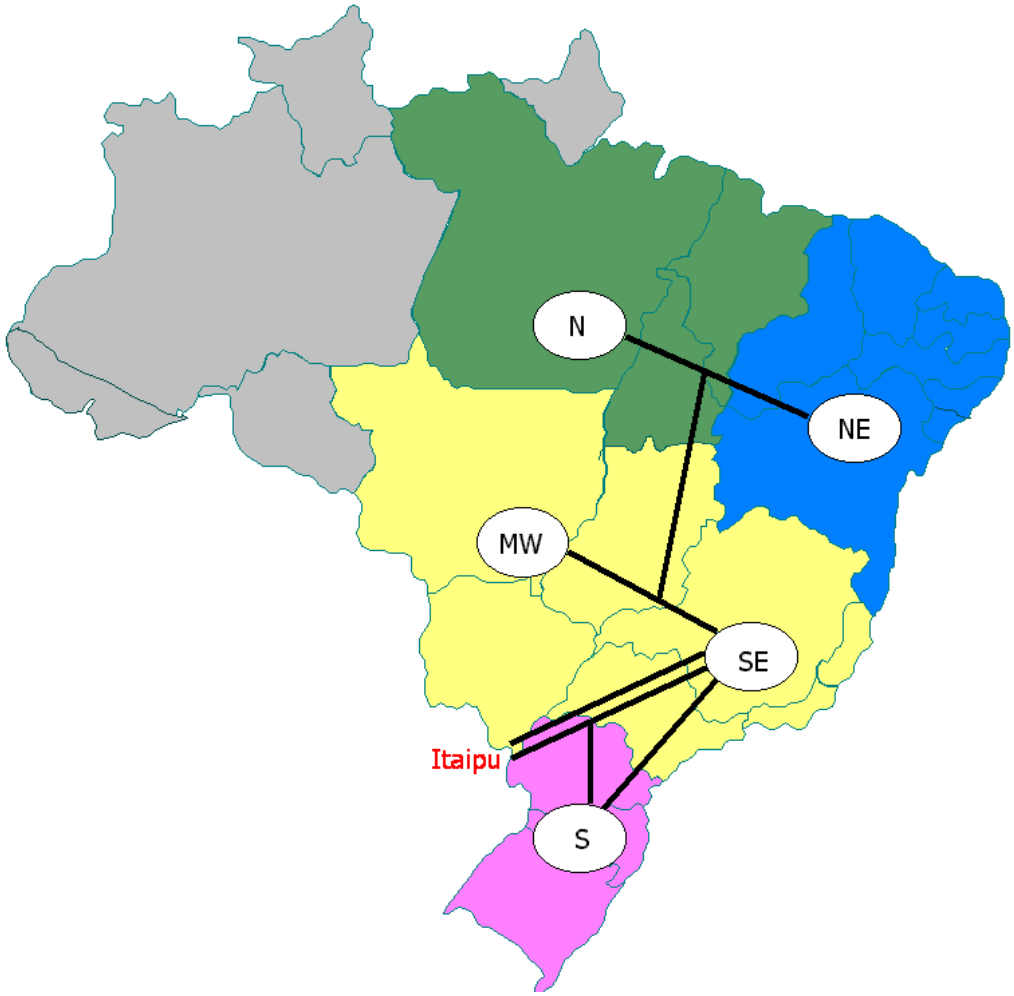
(comparable to

England or Italy)

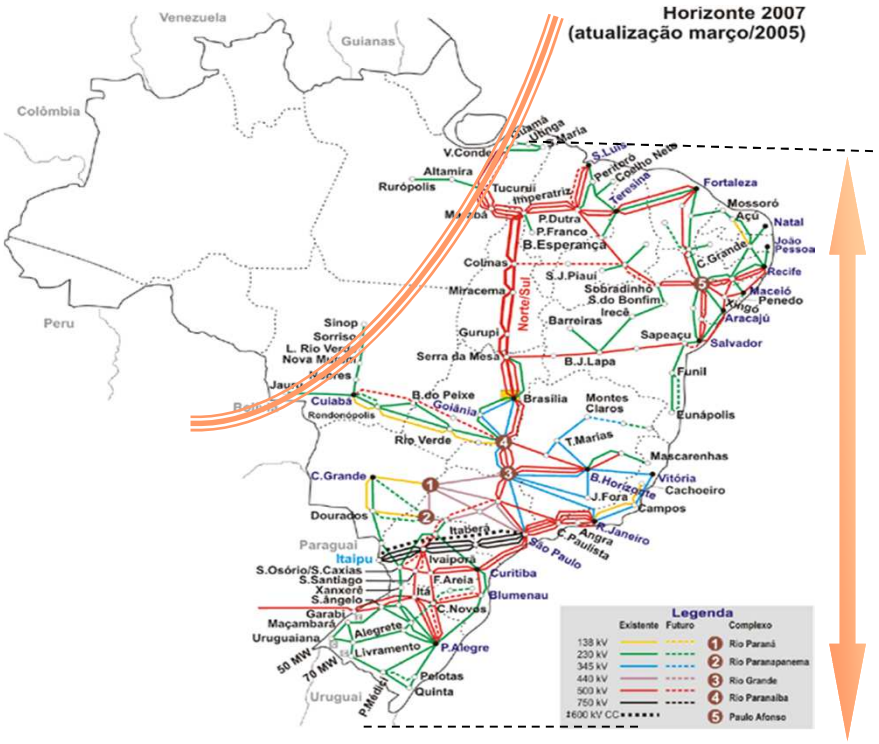
Average production:

51GW X 8760 h/y = 447 T

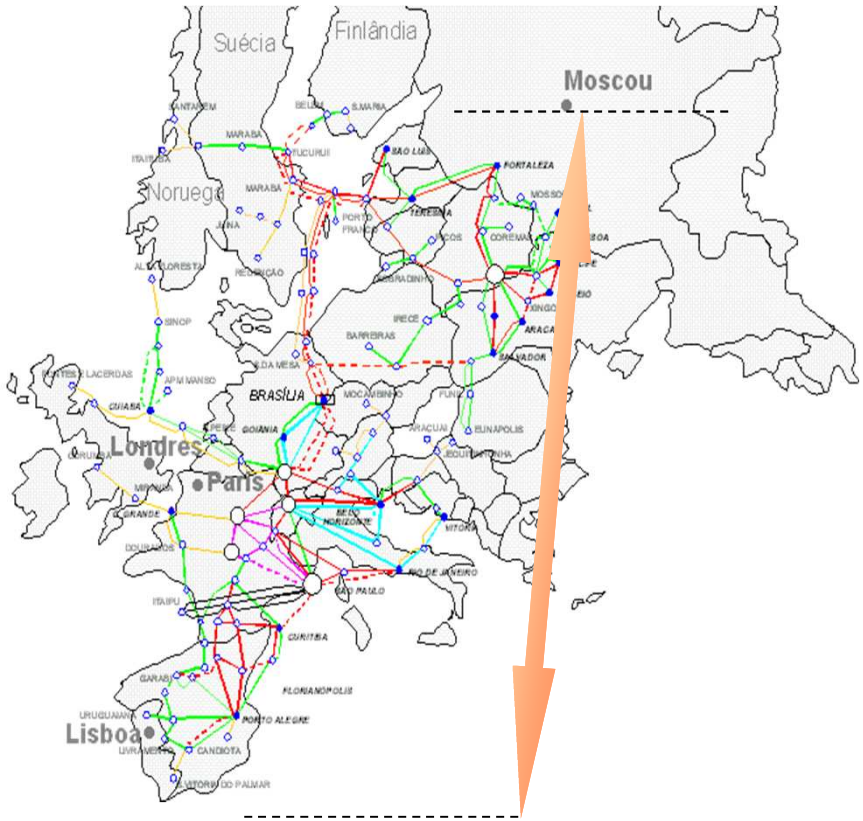
90% is hydro



The transmission system

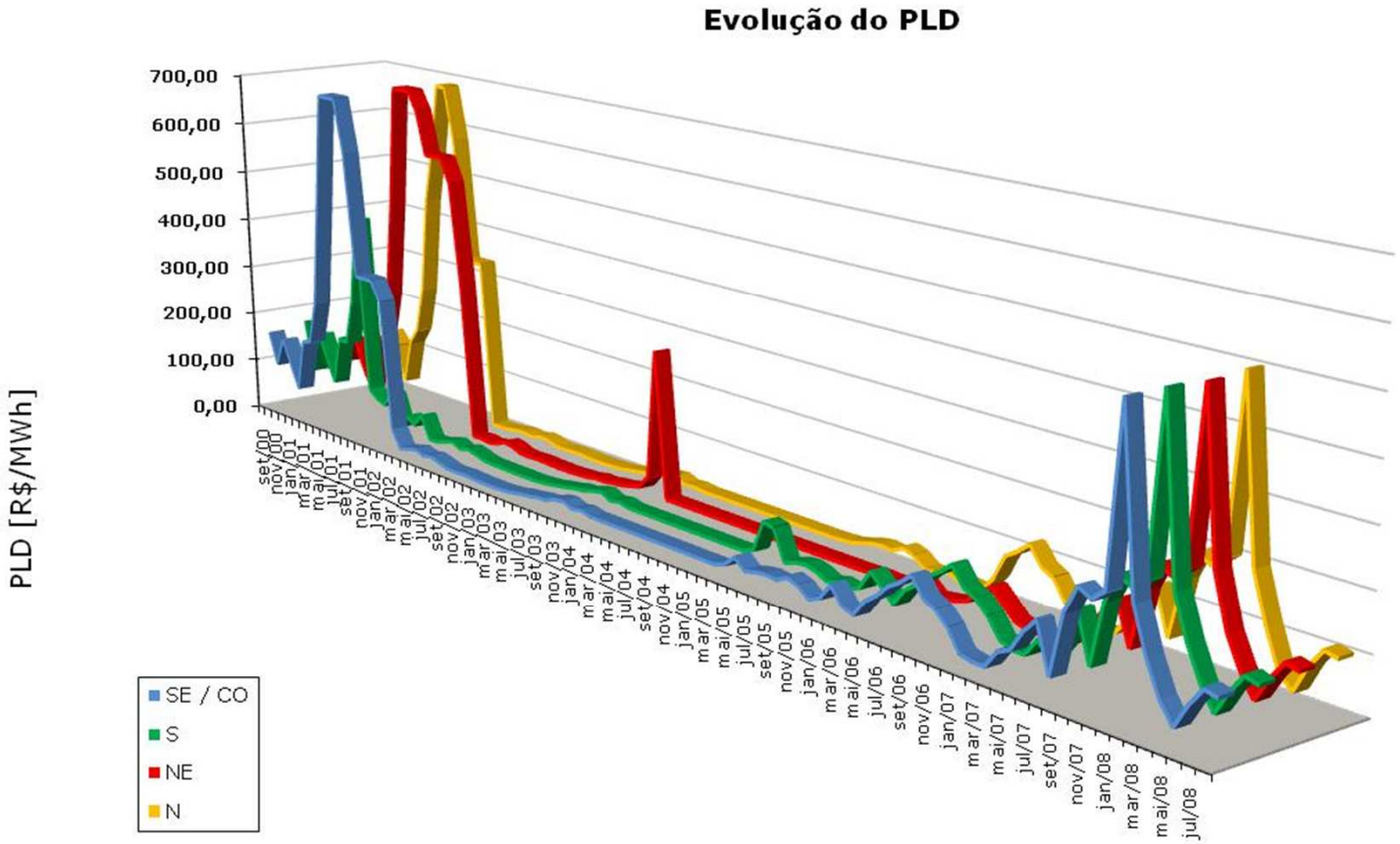


Interconnected System **4 000 km**

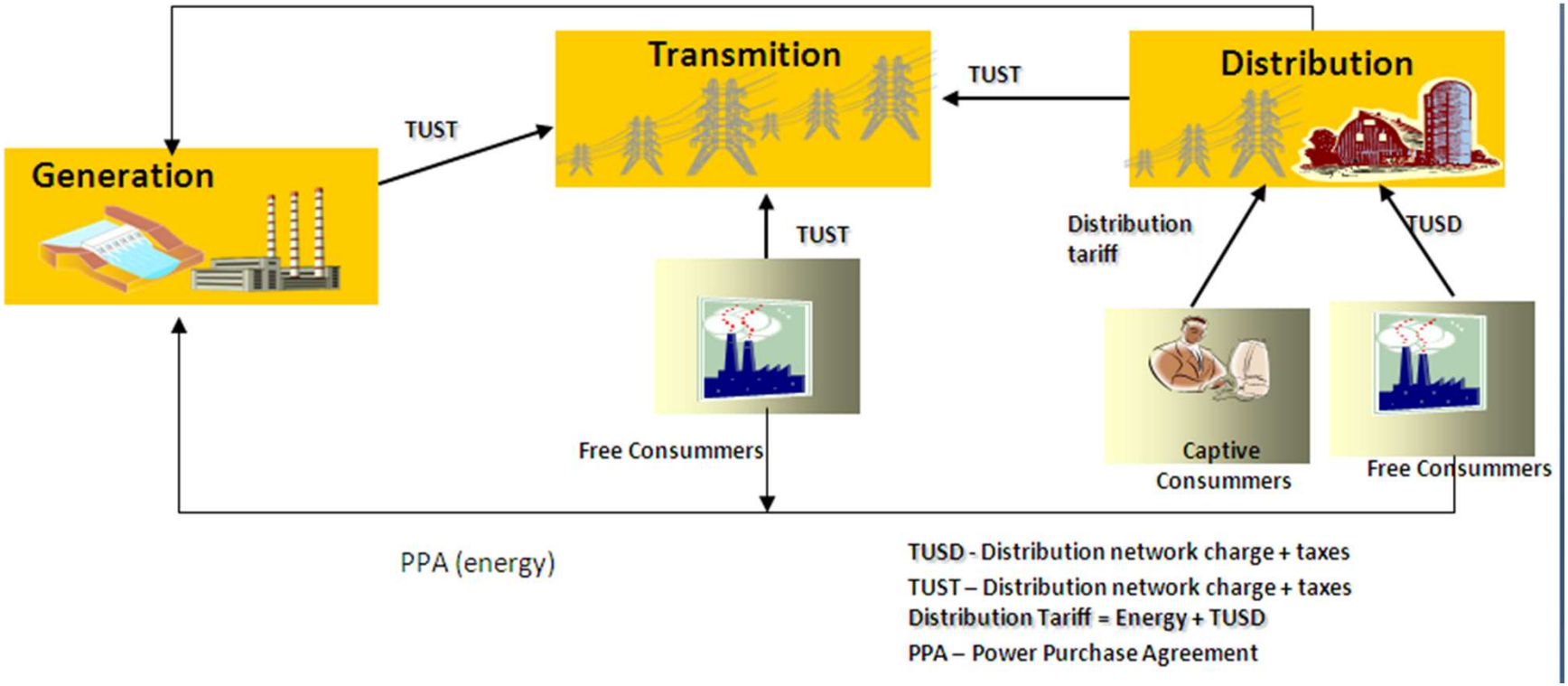


Europe **4 000 km**

Spot price is low most of the time...



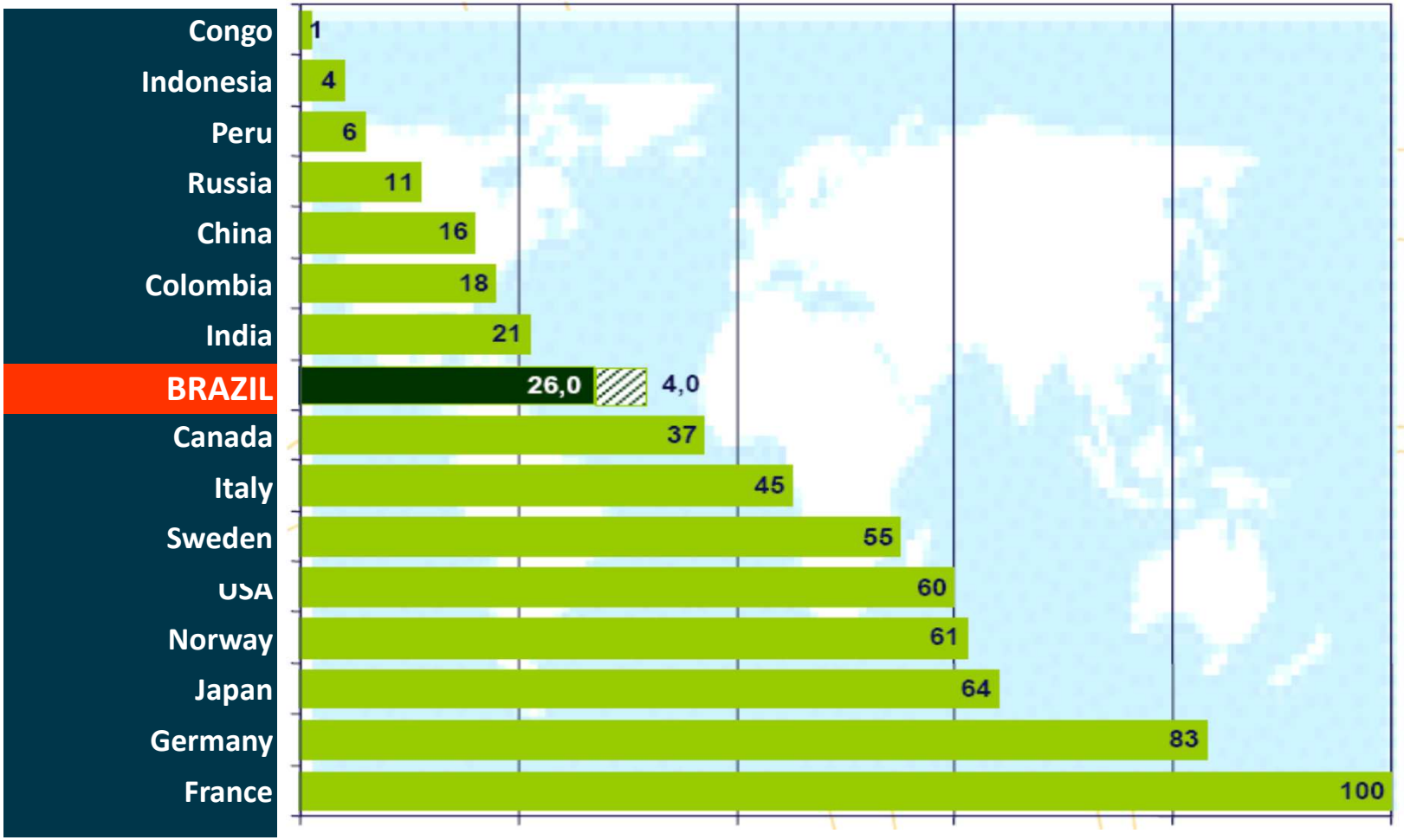
Long term power purchase agreements (PPAs)



Results of recent auctions of energy (competition for the market, rather than in the market)

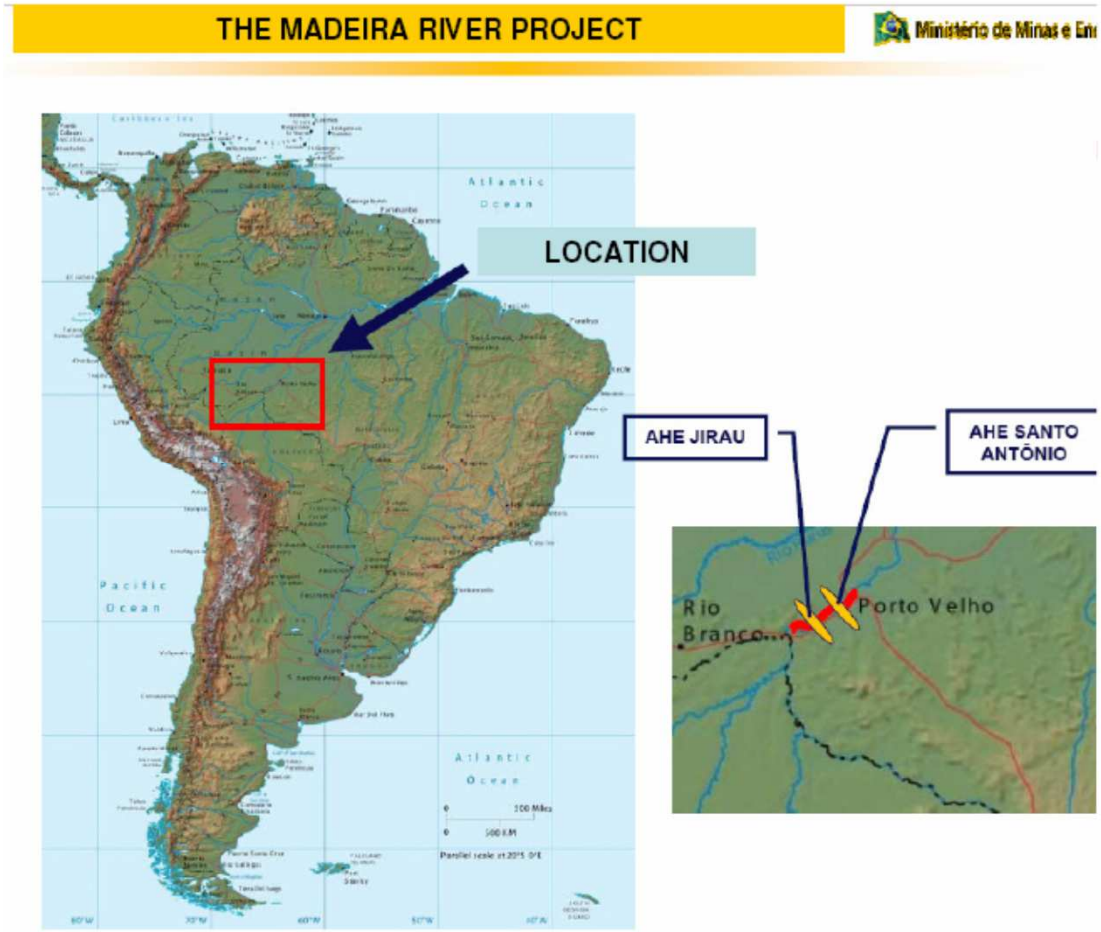
- Sales: ~ 150 TWh/year
- 37% Hydro e 63% Thermal
- (natural gas, oil and coal)
- Total value: ~ US$ 110 billion

Did Brazil run out of sites to build new hydro plants?



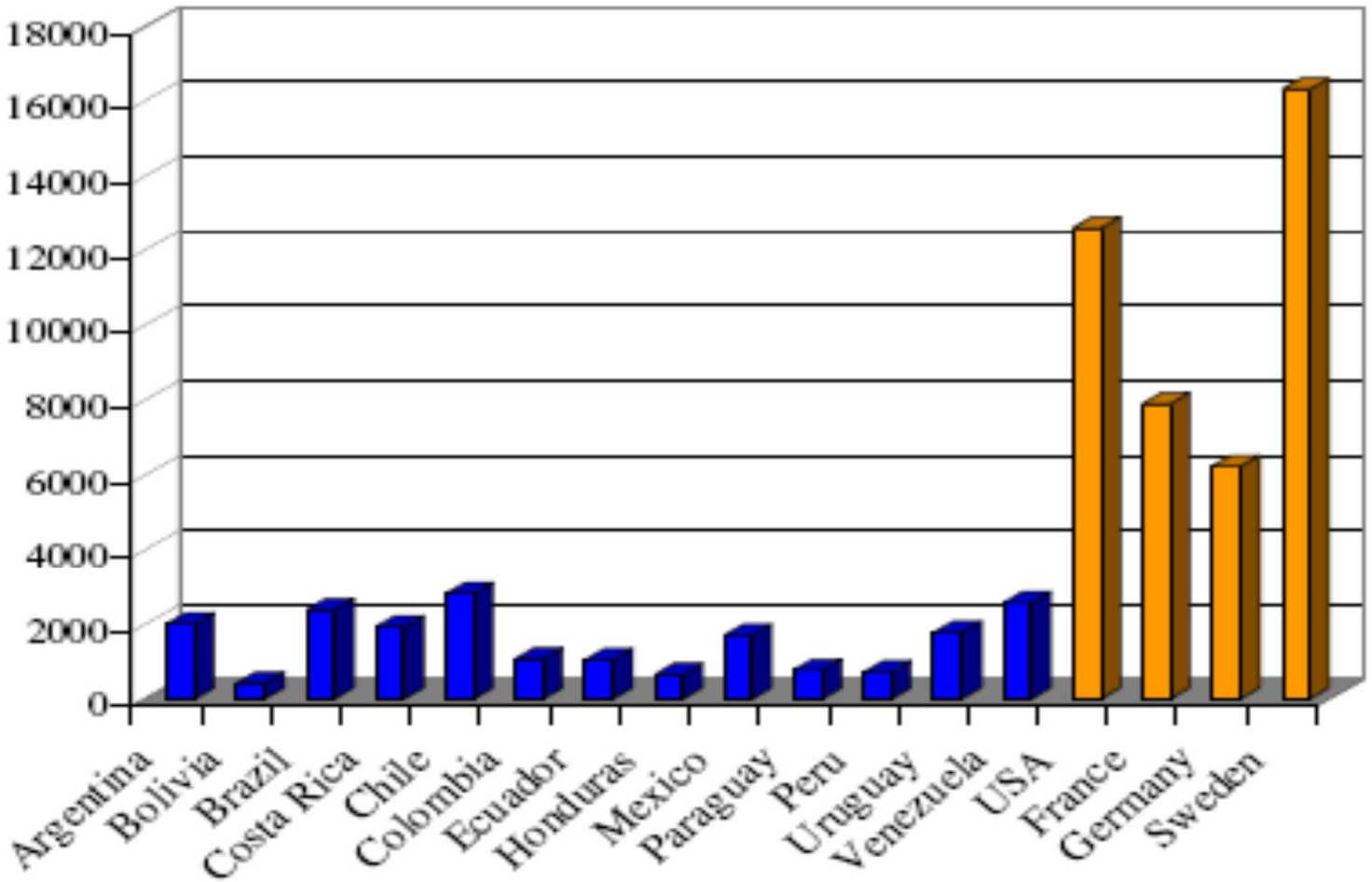
Source: EPE

Hydropower plants in the Amazon river basin



What would be the alternatives?

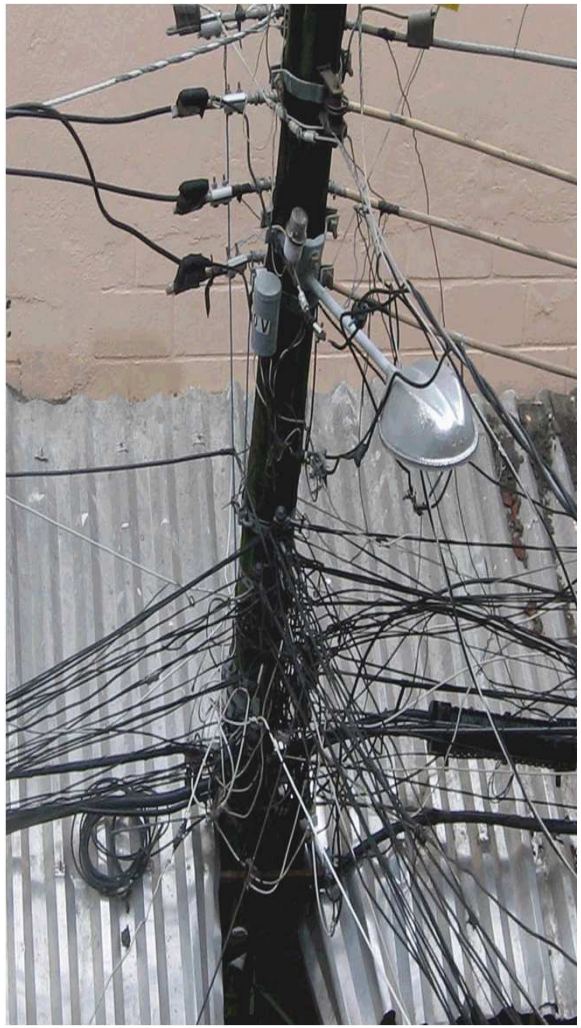
Per capita consumption of electricity



Challenges of Energy Regulation in Rio de Janeiro

Energy Theft: The Problem in Brazil

Waste and Unfair Cost Allocation



22 TWh lost per year in Brazil - 8% of Consumption

Cost Today	Savings if Eliminated
US$ 3.2 Billions per year	US$ 1.6 Billions per year
	US$ 1.6 Billions per year

50% of energy theft wouldn't be consumed if invoiced

Presently paid by honest consumers and DisCo

To be paid by today's dishonest consumers

* Source: ABRADEE, 2008

Challenges of Energy Regulation in Rio de Janeiro

The Regulated DisCo's Perspective

Risk Areas: Where Energy Theft Control is Virtually Impossible

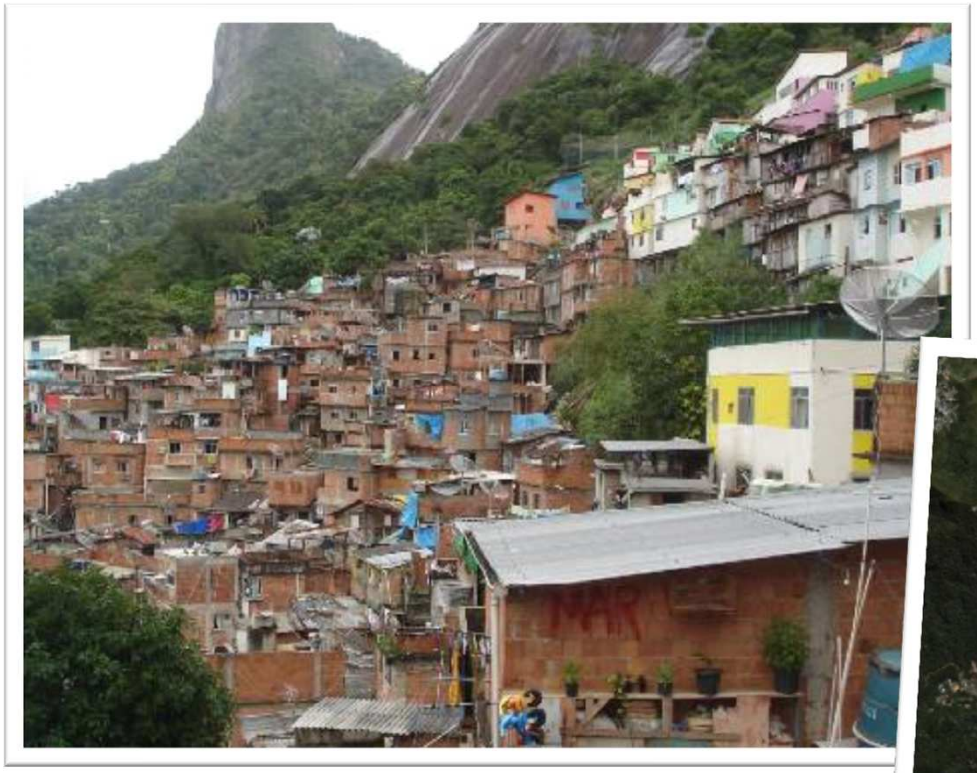
600 communities; **650,000 consumers** (17% of total)

Rio's effort to regain territorial control

- **1 policeman per 40 people**
- **So far, 10 slums, 25,000 families (4% of total)**
- **Before pacification, areas presented extremely high level of non technical losses, above 90%**

- **<u>State Territorial Control: a necessary condition for adequate public services</u>**

The first pacified community: Santa Marta



Before pacification

- Number of families 1,500
- Billed consumers 80
- Revenues US$360/month

Santa Marta: as it was...

- Transformers overcharged
- Precarious low voltage grid

Santa Marta: new grid, new technical solutions

Santa Marta: telemetric electronic gauging

Santa Marta: energetic efficiency

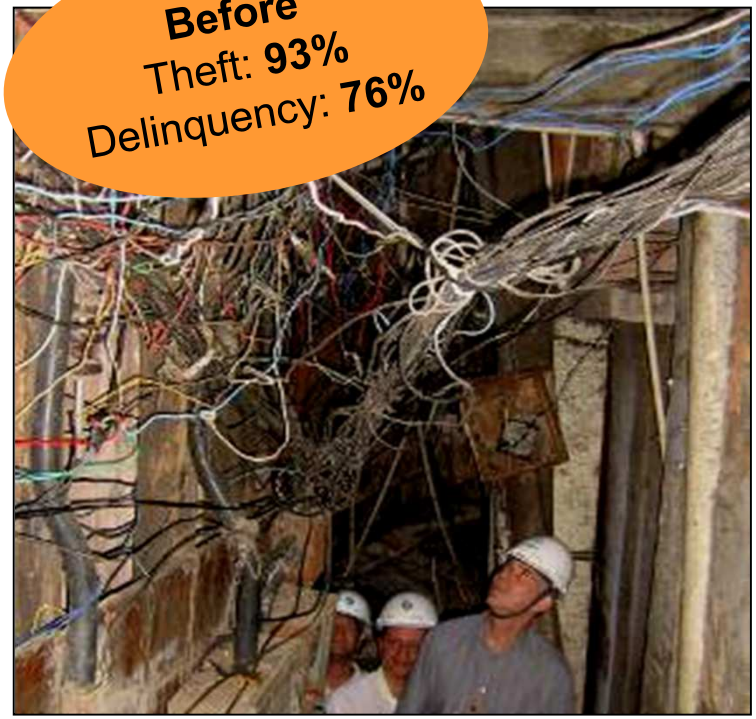
- Replacement of 7,000 incandescent bulb lamps
- Replacement of 700 inefficient refrigerators
- Substitution of internal wiring of 500 households

Challenges of Energy Regulation in Rio de Janeiro

The Regulated DisCo's Perspective

The Santa Marta Experience

1,500 families, US$ 2.2 millions in investments



Investments In the Network: Electronic meters + Anti-theft cables

Other Investments: Replacement of inefficient equipments (refrigerators, light bulbs, …); Customer database; Streets identification